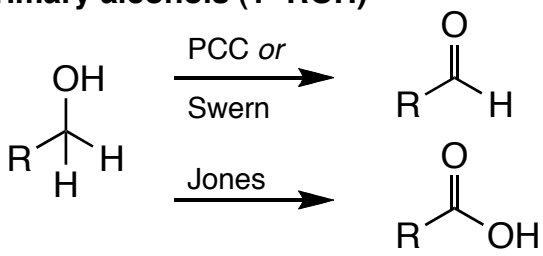
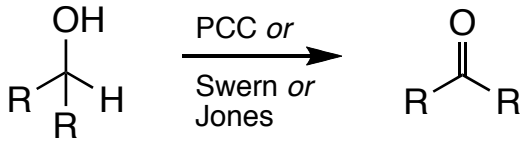
CHM 422 Organic Synthesis, Dr. Laurie S. Starkey
Common Oxidation Reactions

primary alcohols (1° ROH)

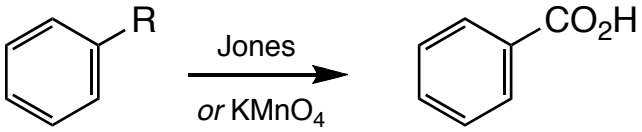


secondary alcohols (2° ROH)

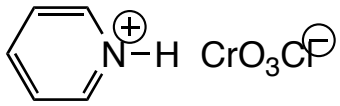


tertiary alcohols (3° ROH) [ox] → no reaction

benzylic carbons (if R is not a quaternary carbon)

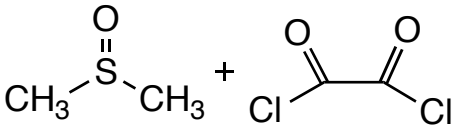


PCC



pyridinium chlorochromate
(CrO_3-py-HCl)

Swern (2 steps)

1. 

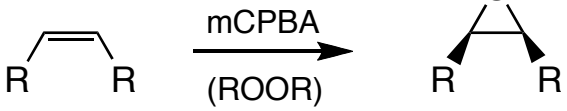
dimethyl sulfoxide (DMSO) oxalyl chloride

2. $(CH_3CH_2)_3N$ (Et_3N, triethylamine)

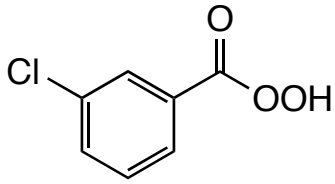
Jones (chromic acid)

CrO_3, H_2SO_4 *or* $Na_2Cr_2O_7$, H_2SO_4

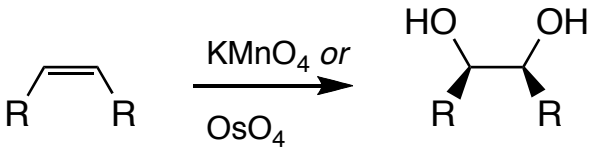
alkenes



epoxidation

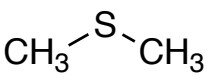


mCPBA:
m-chloroperoxybenzoic acid

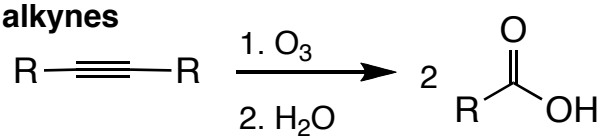


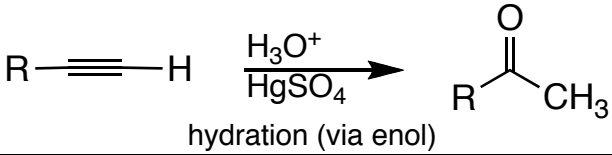
cis dihydroxylation (use H_2O_2/H_3O^+ for *anti* dihydroxylation, via epoxide ring opening)

ozonolysis, followed by reductive workup

DMS: dimethylsulfide 

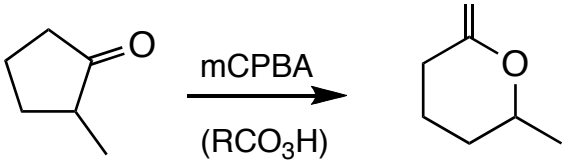
alkynes





hydration (via enol)

ketones



Baeyer-Villiger reaction
migratory aptitude: hydrogen > 3° alkyl > 2° alkyl > phenyl > 1° alkyl > methyl